PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey Of Unnamed Lake (Profile Lake)

M. J. Hunter
March 1997

PWFWCP Report No. 142

105-02894/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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A RECONNAISSANCE SURVEY OF

UNNAMED LAKE # 8

WATERSHED:	Williston Reservoir (Parsnip Reach)
DATE OF SURVEY:	June 30 - July 1, 1996
FIELD CREW LEADER:	Mark Hunter
FIELD ASSISTANT:	Karin Mathias
REPORT PREPARED BY:	Mark Hunter

BRITISH COLUMBIA CONSERVATION FOUNDATION

PEACE / WILLISTON FISH AND WILDLIFE COMPENSATION PROGRAM

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

FUNDED BY: FOREST RENEWAL BRITISH COLUMBIA

RELEASED BY: _____

D. J. Cadden, Regional Fisheries Biologist

LAKE: Unnamed Lake # 8 **SYSTEM NAME:** Nation River
A.S.A.P. REFERENCE NO.: **WATERSHED CODE:** 237-8996

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved 02 / Temp. Profiles	X
Physical Data	X	Winter Dissolved 02 / Temp. Profiles	--
Bench Mark	X	Netting Record	X
Terrain Features	X	Lake Catch Summary	X
Access	X	Individual Fish Data	X
Resorts and Campsites	X	Fish Preserved	--
Other Developments	X	Stomach Analysis	X
Obstructions and Pollutions	X	Scale Reading	X
Special Restrictions	X	Location of Inventory Sites	X
Aquatic Plants	X	Photograph Directory	X
Wildlife Observations	X	Appendices	
Miscellaneous Comments	X	A: Water Chemistry Analysis	X
Lake Drainage	X	B: Tributary Stream Data	X
Fisheries Management Comments	X	C: Fish Scale Analysis	X
History of Previous Surveys	X	Bathymetric Map Reduction	X
Water Chemistry Summary	X	Bathymetric Map	X

LOCATION

Location:	approximately 163 km WNW of Mackenzie		
Elevation:	975 m ± 25 m	U.T.M.:	10.331699.6150821
Latitude / Longitude:	55°28'28" 125°39'46"	N.T.S. Map No.:	93 -N15
Management Unit:	7-28	Biogeoclimatic Zone:	Sub-Boreal Spruce
Ecoprovince:	Sub-Boreal Interior	Ecoregion:	Omineca Mountains
Ecosection:	Manson Plateau		

Drainage: Unnamed C. --> Nation R. --> Tsayta L. --> Nation R. --> Indata L. --> Nation R. --> Tchentlo L. --> Nation R. --> Chuchi L. --> Nation R. --> Williston Reservoir (Parsnip Reach - Nation Arm) --> Peace R.

PHYSICAL DATA

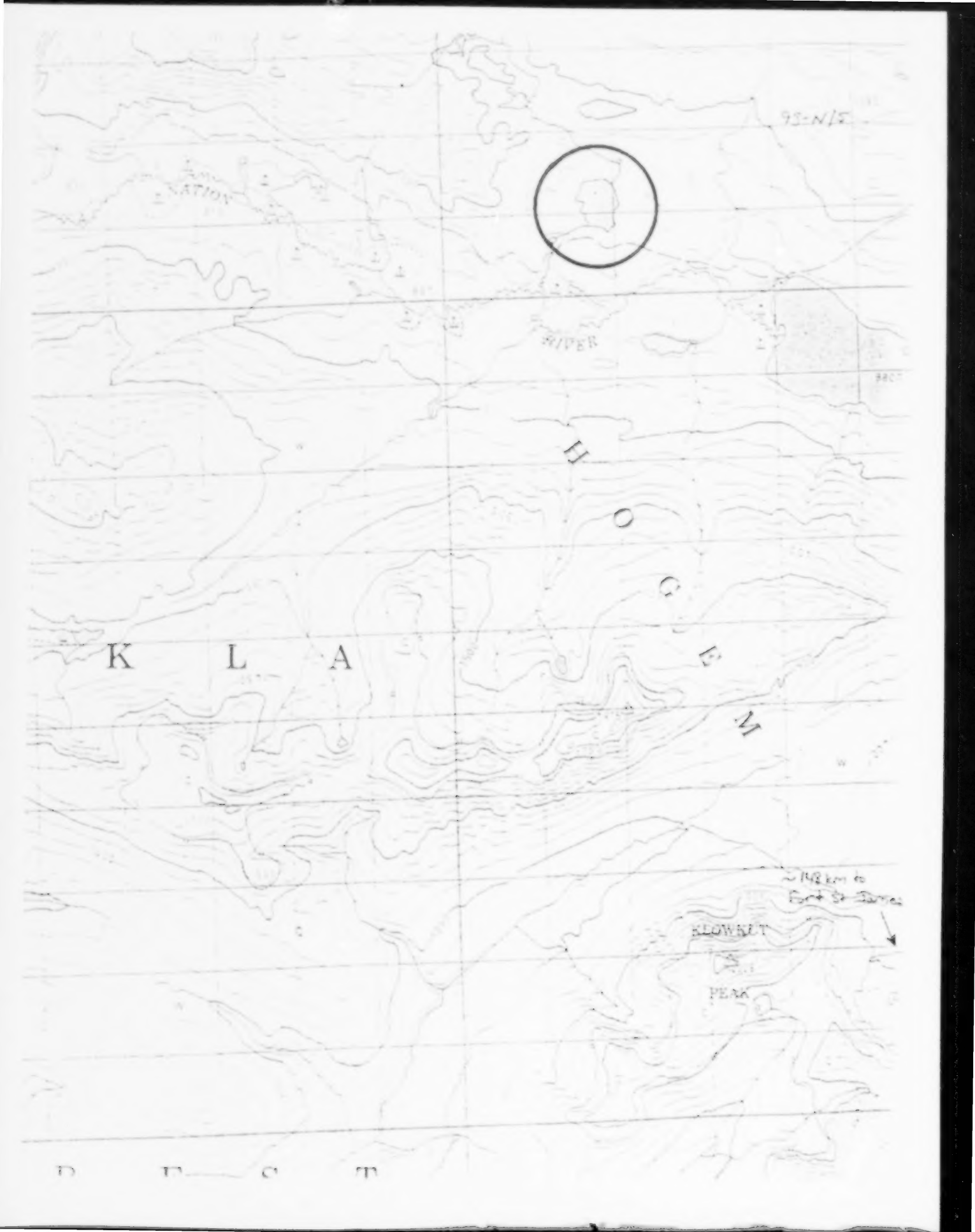
Lake Drainage Area:	15.6 km^2	Volume:	2 597 908 m^3
Water Surface Area:	235 331 m^2	Perimeter of Islands:	0 m
Area Above 6 m Contour:	76 237 m^2	Number of Islands:	0
Shoreline Perimeter:	2 154m	Mean Depth:	11.4 m
Maximum Depth:	29.2 m	Secchi Reading:	4.83 m
Filterable Residue (TDS):	90 mg/L		

Sounding Device: Lowrance X-15 Elevation Source: Contour Interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 32 cm diameter spruce tree that is located halfway along the south shore (Plate # 4).

High Water Mark: 0.05 m above water level at time of survey


93-N/15
NATION
RIVER
K L A
~148km to
KLOWEST
PEAK

LAKE: Unnamed Lake # **8**

TERRAIN FEATURES

Immediate Shoreline:

Unnamed Lake # 8 is fronted on almost all sides by a fairly thick growth of alders with some willows and sedge grasses. There is also some scrub birch mixed in with this growth mainly along the east shore of the lake. Lodgepole pine trees grow behind the frontal shrub growth on the south shore, while spruce dominates the tree growth behind the shrubs on all other sides of the lake. The exceptions are the marsh areas located in the northeast corner and on the southwest side of the lake; these areas contain mostly sedge grasses with some alders and willows. There is a moderately steep to steep slope away from the lake's edge on the south and northwest sides of Unnamed Lake # 8, and a low slope away from the lake on all other sides. The shoreline substrate along all sides of Unnamed Lake # 8, except in front of the two marshes, is predominately large gravels and small cobbles covered in a fine layer of silt. In front of the two marshes, the substrate is mainly fines and organics. The lake's bottom drops off steeply away from the lake's edge. Large woody debris and yellow waterlily (Nuphar sp.) are found around the entire lake.

Surrounding Country:

The surrounding forest to the north, east and west of Unnamed Lake # 8 is dominated by spruce trees, with gently rolling hills to the north and east, and moderately steep hills to the west. To the south, lodgepole pine trees dominate the tree growth on rolling hills. Mountains can be seen in the near distance to the north and south of the lake. Unnamed Lake # 8 is situated within the Sub-Boreal Spruce biogeoclimatic zone.

LAKE: Unnamed Lake # 8

ACCESS

Directions:

From the junction of Highway 27, the Teardrop Forest Service Road and the Germansen Landing North Road, drive west on the Teardrop Forest Service Road for approximately 40 km. Turn right on to the Leo Creek Forest Service Road, and proceed north for approximately 68 km. Turn right on to the Driftwood Forest Service Road and continue north for approximately 56.5 km, then turn right and drive approximately 3 km east on the Fall-Tsyata Forest Service Road. On this corner, there is a 450 m long trail on the north (left) side of the road that leads back to Unnamed Lake # 8.

Road Type and Conditions:

The four Forest Service Roads are all well-maintained, two-lane gravels roads that can be easily traveled in the summer with a two-wheel drive vehicle. The 450 m long trail that leads into Unnamed Lake # 8 would be passable with an All Terrain Vehicle.

Restrictions:

None.

RESORTS AND CAMPSITES

There are no resorts or campsites located on Unnamed Lake # 8.

OTHER DEVELOPMENTS

There is an old trail that is partly overgrown the leads from the Fall-Tsayta Forest Service Road to the top of the hill on the south side of Unnamed Lake # 8. This trail could be driven on using an All Terrain Vehicle.

OBSTRUCTIONS AND POLLUTIONS

There is an old row boat that has sunk in the first part of the outlet creek, approximately 10.0 m downstream of Unnamed Lake # 8.

LAKE: Unnamed Lake # 8

SPECIAL RESTRICTIONS

None noted.

AQUATIC PLANTS

The following aquatic plants were observed on Unnamed Lake # 8:

yellow waterlily (Nuphar sp.) sedge grasses

WILDLIFE OBSERVATIONS

During the time spent on Unnamed Lake # 8 during the inventory, the following wildlife or signs were observed:

moose droppings 1 red squirrel

unidentified ducks

MISCELLANEOUS COMMENTS

1) There is a large amount of large woody debris along most of the shoreline that could be hazardous to boaters.

2) According to the owner of the Tsayta Lake Lodge (located approximately 8 km away), there was a large black bear that frequented the area immediately near Unnamed Lake # 8.

3) Bathymetric map: The lake outline is drawn from an enlargement of air photo 30 BCB 90089: No. 183, flown July 25, 1990.

LAKE: Unnamed Lake # 8

LAKE DRAINAGE

General:

Unnamed Lake # 8 is fed by four creeks - two from the north and two from the west. The two inlets that enter the lake from the north are the main inlets. The outlet creek drains Unnamed Lake # 8 to the southwest and runs for approximately 1.5 km to it's confluence with the Nation River.

Major Systems:

There are no major systems.

Minor Systems:

Inlet # 1 - Unnamed Creek

Inlet # 1 is heavily braided through a swampy area as it enters the northeast corner of Unnamed Lake # 8 (Plate # 5). The main channel has a 1.0 m high beaver dam on it located approximately 30 m upstream of the lake. Approximately 125 m upstream of the lake there is a second beaver dam that is 0.7 m high and 45 m long. Above this dam, the channel is only occasionally braided. The average wetted width is 15.0 m and the depth is 1.0 m. The substrate is exclusively fines and organics. Inlet # 1 has only limited fisheries potential as a good rearing creek, but has no spawning substrate.

A Stream Survey card was completed for a sample site located approximately 150 m upstream of Unnamed Lake # 8 (Plates # 6 & # 7). The average wetted width is 15 m and the average maximum pool depth is 1.0 m. The creek morphology is exclusively one large pool at this point. The water temperature was 15 °C at the time of the survey. For more information, refer to Appendix B.

Inlet # 2 - Unnamed Creek

Inlet # 2 enters Unnamed Lake # 8 on the north shore of the lake. Approximately 10 m upstream of Unnamed Lake # 8, there is a 1.5 m high and 40 m long beaver dam across Inlet # 2 that was probably impassable to upstream fish movement at the time of survey (Plate # 8). The dam has formed a small pond on the upstream side that has some alder and willow clumps growing in it. Two channels enter the pond; the right channel (looking upstream) flows from the direction of the swamp that Inlet # 1 drains. The second channel flows from the north and contains gravels and cobbles that offer some good patches of spawning gravel.

LAKE: Unnamed Lake # 8

A Stream Survey card was completed for a sample site located approximately 200 m upstream of Unnamed Lake # 8 (Plates # 9 & # 10). At this point, the average wetted width is 2.8 m and the average maximum riffle depth is 0.4 m. The substrate is comprised of small cobbles (40%), fines (35%) and gravels (20%). Lots of overhanging vegetation, cutbanks and large woody debris provide good cover for fish in the stream. For more information, refer to Appendix B.

Inlet # 3 - Unnamed Creek

Inlet # 3 enters Unnamed Lake # 8 on the west side of the lake (Plate # 11). The creek has an average wetted width of 2.0 m and depth of 0.15 m, and has very little flow. The substrate is moss and organics. The creek goes underground approximately 17 m upstream of Unnamed Lake # 8. Inlet # 3 had no fisheries potential during the survey period.

Inlet # 4 - Unnamed Creek

Inlet # 4 enters Unnamed Lake # 8 on the west side of the lake north of Inlet # 3 (Plate # 12). The first 15.0 m of Inlet # 4 has an average wetted width of 1.0 m and depth of 0.6 m with an organic bottom. From approximately 10 m to 15 m upstream of the lake, the channel is formed of pools of water connected by underground flow. Approximately 15 m upstream of Unnamed Lake # 8, there is a 0.15 m high falls. At the time of the survey, upstream fish movement over the falls was prevented by the bushy top of spruce tree that had fallen into the channel at this point. Upstream of the falls, the channel has an average wetted width of 0.5 m and depth of 0.1 m, with one pool located approximately 20.0 m upstream of the lake that is 0.75 m deep. The channel in this section of the creek is filled with large and small woody debris. The creek goes underground approximately 40.0 m upstream of Unnamed Lake # 8. Inlet # 4 had no fisheries potential during the survey period.

Outlet - Unnamed Creek

The outlet drains Unnamed Lake # 8 from the southwest corner of the lake (Plate # 13). The first 20 m of the outlet creek has an average wetted width of 22 m and a maximum depth of 2.5 m to 3.0 m. The substrate is mostly fines, silts and organics. Approximately 20 m downstream of Unnamed Lake # 8, there is a 0.65 m high and 25 m long beaver dam (Plate # 14). Upstream fish movement over the dam was prevented at the time of survey as the only water flow seen was through the alder roots and woody debris at the top of the dam, not over the dam. The outlet creek flows through a culvert as it crosses the Fall-Tsayta Forest Service Road approximately 650 m downstream of the lake.

A Stream Survey card was completed for a sample site located approximately 250 m downstream of Unnamed Lake # 8 (Plate # 15 & # 16). At this point, the average wetted width is 8.0 m and average maximum riffle depth is 0.40 m. The substrate is comprised of mainly small cobble (45%) and gravels (30%), which offers areas of good spawning

habitat. Good cover is provided by large woody debris, instream vegetation and overhanging vegetation. Just below the bottom of the sample site, there is a debris jam that may hinder fish movement. During the time of survey, some redside shiners were seen in the sample site. For more information, refer to Appendix B.

LAKE: Unnamed Lake # 8

FISHERIES MANAGEMENT COMMENTS

Unnamed Lake # 8 supports a small population of rainbow trout and whitefish. Therefore, it is recommended that Unnamed Lake # 8 be used only as a very low intensity fishery. Heavy use of this lake could ruin the small populations that do exist. By putting a partial breach in the beaver dam on either the outlet creek or Inlet # 2, it may be possible to increase the population of rainbow trout and whitefish in Unnamed Lake # 8 by providing easier access to spawning habitat. According to the owner of the Tsayta Lake Lodge, there is an annual migration of lake trout into and out of Unnamed Lake # 8 each spring. If this is true, then Unnamed Lake # 8 should be protected from any activities that might have a detrimental effect on the lake in order to preserve this unique population of lake trout.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Studies:

None known.

LAKE: Unnamed Lake # 8
WATER CHEMISTRY SUMMARY

Field Conditions: **Limnology Station No. 1**

Date:	June 30, 1996		
Time:	1300 hrs	Air Temperature:	16 °C
Wind Velocity:	15 - 20 km/h	Wind Direction:	from the S
Cloud Cover:	7 / 10 o.c.	Surface Conditions:	rippled
Secchi Disc:	4.83m	Water Colour:	yellowish

Method Used:

Dissolved Oxygen:	YSI Model 57 Oxygen / Temperature Meter
Water Temperature:	YSI Model 57 Oxygen / Temperature Meter
Air Temperature:	Hand-Held Alcohol Thermometer
pH (field):	Digital pH Pocket Tester
H2S (field):	Hach H2S Field Test Kit
Laboratory Used:	Pacific Environmental Science Center
Water Sampler:	Vertical Alpha Water Bottle (Vandorn)
Metal Sampler:	By Hand; Preserved With 2.0 mL Nitric Acid
Substrate Sampler:	Substrate Sample Not Taken

Water Sample Chemistry: SEAM **Site No.:** E223188

	Sampling Depths	
	Surface (0.5 m)	Lower (26.5 m)
Alkalinity (lab)	60.6 mg / L	84.9 mg / L
Filterable Residue 105°C (lab)	90 mg / L	110 mg / L
H2S (field)	N/A	0 mg / L
Nitrogen - Total (lab)	0.18 mg / L	0.21 mg / L
Non-Filterable Residue (lab)	< 5 mg / L	< 5 mg l L
pH (field)	8.6	8.0
pH (lab)	7.87	7.39
Phosphorus - Total Dissolved (lab)	0.012 mg / L	0.014 mg / L
Specific Conductance (lab)	120 µS / cm	169 µS / cm

Bottom Depth: 27.6 m

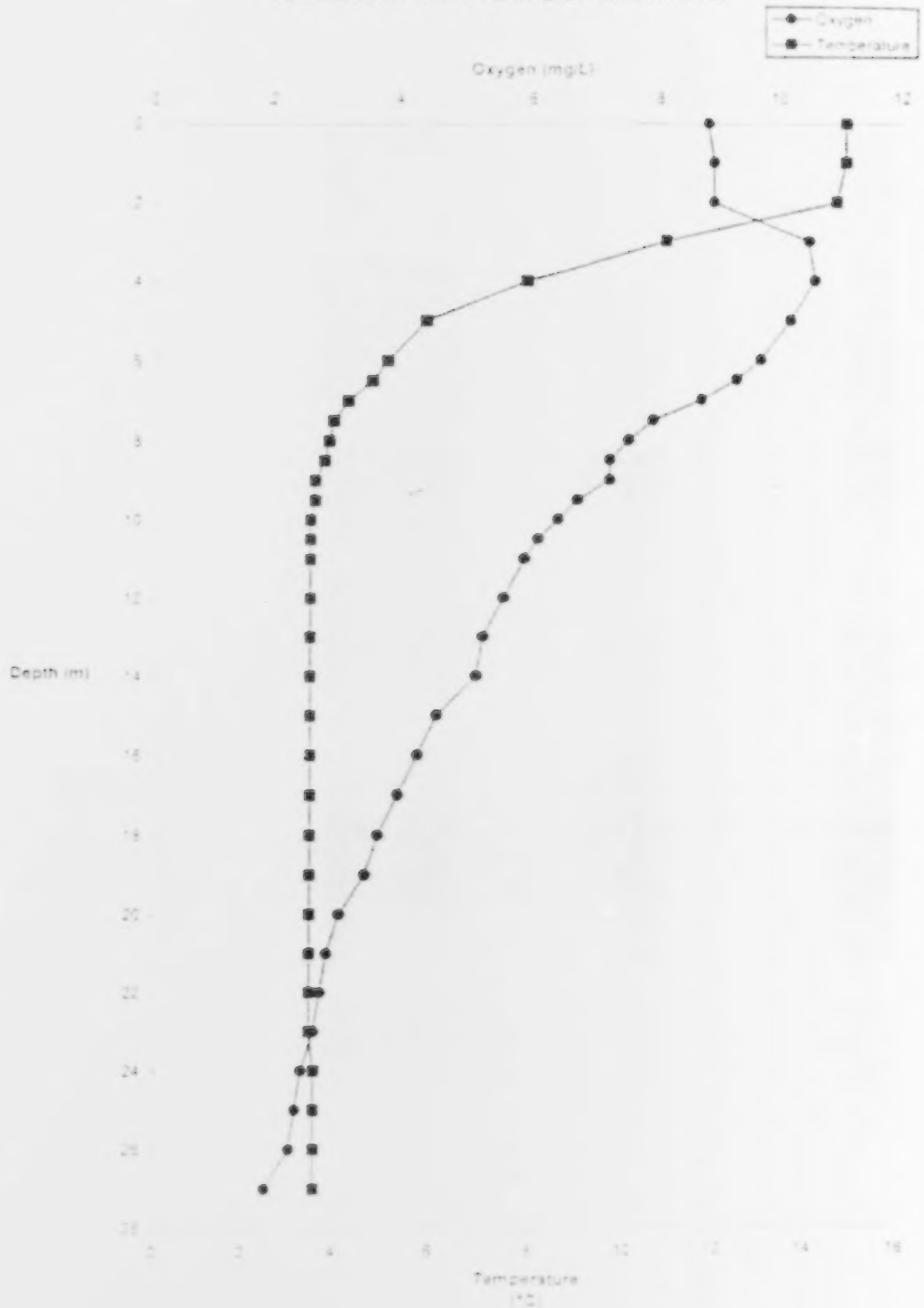
Substrate Sample Depth: N/A

* additional analyzed parameters and results, including metals, are found in Appendix 1

LAKE: Unnamed Lake # 8

SUMMER OXYGEN / TEMPERATURE DATA

DEPTH (m)	02 (mg/L)	TEMPERATURE (°C)
Surface	8.8	14.8
1.0	8.9	14.8
2.0	8.9	14.6
3.0	10.5	10.8
4.0	10.6	7.9
5.0	10.2	5.9
6.0	9.7	5.1
6.5	9.3	4.8
7.0	8.7	4.3
7.5	7.9	4.0
8.0	7.5	3.9
8.5	*7.2*	3.8
9.0	7.2	3.6
9.5	6.7	3.6
10.0	6.4	3.5
10.5	6.1	3.5
11.0	5.9	3.5
12.0	5.6	3.5
13.0	5.3	3.5
14.0	5.2	3.5
15.0	4.6	3.5
16.0	4.3	3.5
17.0	4.0	3.5
18.0	3.7	3.5
19.0	3.5	3.5
20.0	3.1	3.5
21.0	2.9	3.5
22.0	2.8	3.5
23.0	2.7	3.5
24.0	2.5	3.6
25.0	2.4	3.6
26.0	2.3	3.6
27.0	1.9	3.6
27.6	Bottom	


SUMMER OXYGEN / TEMPERATURE PROFILE
Oxygen
Temperature
Oxygen (mg/L)
Depth (m)
Temperature (°C)

LAKE: Unnamed Lake # 8

NETTING RECORD

Mesh Size Experimental Order: 25, 76, 51, 89, 38, 64 mm

NETTING SITE # 1

Type:	Sinking Monofilament Gill Net			
Date Set:	June 30, 1996		Time:	1140 hrs
Date Lifted:	June 30, 1996		Time:	1645 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	2.Om
			Substrate:	fines / organics
Deep End Mesh Size:	64 mm		Depth:	11.0 m
			Substrate:	fines

Comments:

NETTING SITE # 2

Type:	Sinking Monofilament Gill Net			
Date Set:	June 30, 1996		Time:	1650 hrs
Date Lifted:	June 30, 1996		Time:	1825 hrs
Net Dimensions:	Length:	91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm		Depth:	2.0 m
			Substrate:	fmes / organics
Deep End Mesh Size:	64 mm		Depth:	13.5 m
			Substrate:	fines / organics

Comments:

LAKE CATCH SUMMARY

Species	Netting Site		Angled	Other	Total	Number Sampled	Number Preserved	Size Range (cm)
	No. 1	No. 2						
RB	7	1	0	0	8	8	0	11.8-27.5
WF	5	12	0	0	17	0	0	26.4-38.0
BB	0	1	0	0	1	0	0	51.0
LND	0	4	0	0	4	0	0	10.9-12.7

LAKE: Unnamed Lake # 8

Minnow Traps:

Bait: Sardines

Trap No.	Hours	Depth (m)	Substrate	Species	No. Caught	Size Range (cm)
1	7:02	1.1	silt / organics	LKC	1	7.4
2	7:04	0.8	silt / organics	LKC	1	6.8
				CC	2	5.4 - 8.3
3	7:05	0.6	organics/	LKC	3	3.6 - 8.0
			sedge grass	CC	3	7.6 - 8.4
				LND	1	7.9
4	7:08	0.6	woody debris	RSC	39	7.7 - 9.9
			over gravel	?	11	4.9 - 9.0

INDIVIDUAL FISH DATA

M - Male
F - Female
? - Not Obvious

IMM - Immature
MG - Maturing
MT - Mature
GV - Gravid
SP - Spent
? - Not Obvious

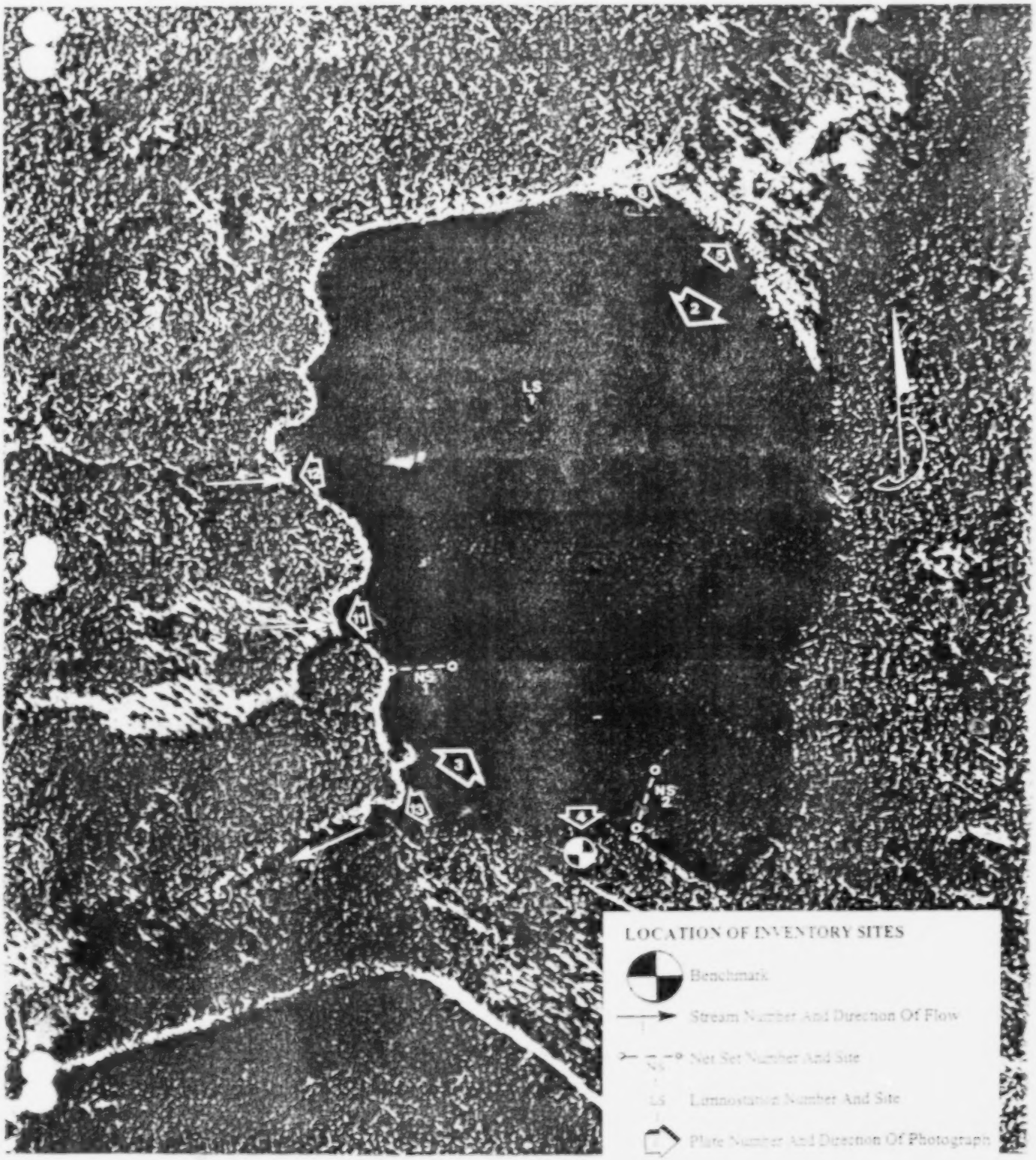
EG - Egg
FR - Fin Ray
HD - Head
ML - Milt
OT - Otolith
SC - Scale

Date Captured: Sept. 30, 1996

Method: Sinking Monofilament Gillnet

Species	Fork Length (cm)	Weight (grams)	Sex	Gonadal Maturity	Sample Type	Age (yr)	Stomach Contents				Comments
							Plankton	Insects	Fish	Other	
RB	24.7	143.7	F	Imm	SC			Cr		O	
RB	27.5	202.9	M	Imm	SC			CF		O	Li on gills
RB	23.9	150.5	M	Imm	SC			B		O	Li on gills
RB	11.8	101.6	F	Imm	SC			B			Li on fins and gills
RB	26.5	189.2	M	Imm	SC			B		O	
RB	16.5	185.5	F	Imm	SC			B		O	
RB	12.9	25.3	M	Imm	SC			B			
RB	23.0	116.9	F	Imm	SC			B		O	Li on gills, TW in St

B - Beetle
C - Clam
CF - Caddis Fly
CH - Chaoborus
Cr - Chaoborus
Di - Diptera
G - Crayfish
L - Leech
Li - Lice
O - Organics
S - Snails
St - Stomach
TP - Tape Worm
WB - Water Boatman
WF - Whole Fish


LOCATION OF INVENTORY SITES
Benchmark
Stream Number And Direction Of Flow
Net Set Number And Site
LS Limnological Number And Site
Plate Number And Direction Of Photograph

LAKE: Unnamed Lake # 8

PHOTOGRAPH DIRECTORY

Plate	Roll : Number	Description
1	2: 7	Aerial view of Unnamed Lake # 8 looking west.
2	2: 3-6	Panoramic view of Unnamed Lake # 8 looking southwest from the northeast corner of the lake.
3	2:1-2; 3: 23-24	Panoramic view of Unnamed Lake # 8 looking northeast from the southwest corner of the lake.
4	3: 9	View of the benchmark located 2.0 m above present water level in a 32 cm diameter spruce tree that is located halfway along the south shore.
5	3: 20	View of the mouth of Inlet # 1 where it enters Unnamed Lake # 8 in the northeast corner of the lake.
6	3: 22	Upstream view from the middle of the sample site on Inlet # 1, taken approximately 150 m upstream of Unnamed Lake # 8.
7	3: 21	Downstream view from the middle of the sample site on Inlet # 1, taken approximately 150 m upstream of Unnamed Lake # 8.
8	3: 19	Upstream view of beaver dam # 1 on Inlet # 2, located approximately 10 m upstream of Unnamed Lake # 8. Dam height is 1.5 m high.
9	3: 17	Upstream view of the sample site on Inlet # 2, taken approximately 190 m upstream of Unnamed Lake # 8.
10	3: 18	Downstream view of the sample site on Inlet # 2, taken approximately 210 m upstream of Unnamed Lake # 8.
11	3: 16	View of the mouth of Inlet # 3 where it enters Unnamed Lake # 8 on the west side of the lake.
12	3: 15	View of the mouth of Inlet # 4 where it enters Unnamed Lake # 8 on the west side of the lake.
13	3: 10	View of the mouth of the outlet where it drains Unnamed Lake # 8 in the southwest corner of the lake.

LAKE: Unnamed Lake # 8

14	3: 14	Upstream view of beaver dam # 1 on the outlet, located approximately 20 m downstream of Unnamed Lake # 8. Dam height is 0.65 m.
15	3: 11	Upstream view of the sample site on the outlet, taken approximately 265 m downstream of Unnamed Lake # 8.
16	3: 13	Downstream view of the sample site on the outlet, taken approximately 235 m downstream of Unnamed Lake # 8.

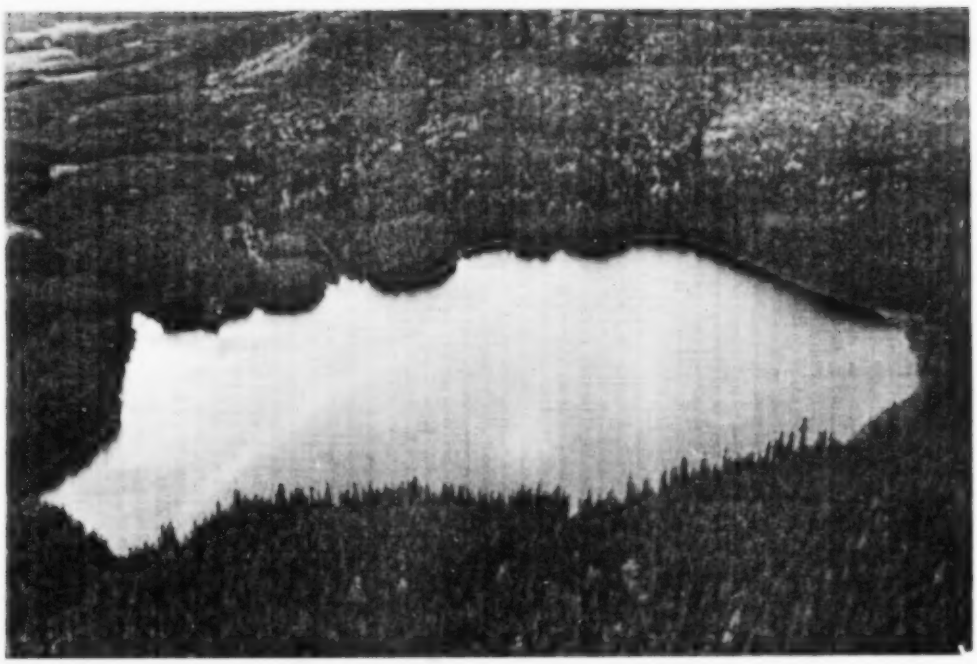


Plate # 1: Aerial view of Unnamed Lake # 8 looking west.

LAKE - Unnamed Lake # 8

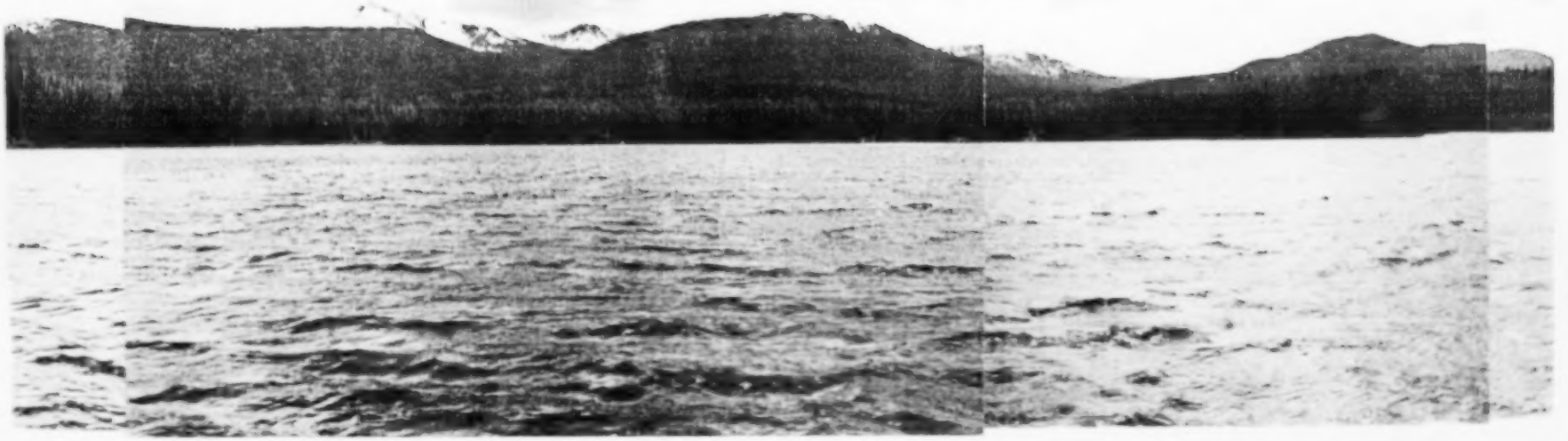


Plate # 2: Panoramic view of Unnamed Lake # 8 looking southwest from the northeast corner of the lake.

LAKE - Unnamed Lake # 8

Plate # 3: Panoramic view of Unnamed Lake # 8 looking northeast from the southwest corner of the lake.

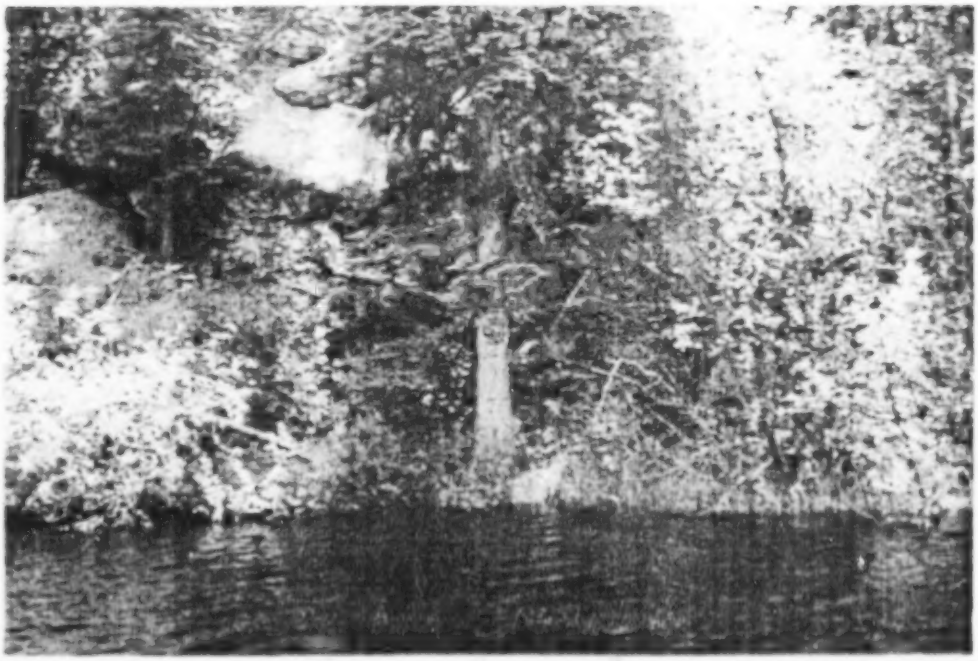


Plate # 4: View of the benchmark located 2.0 m above present water level in a 32 cm diameter spruce tree that is located halfway along the south shore.

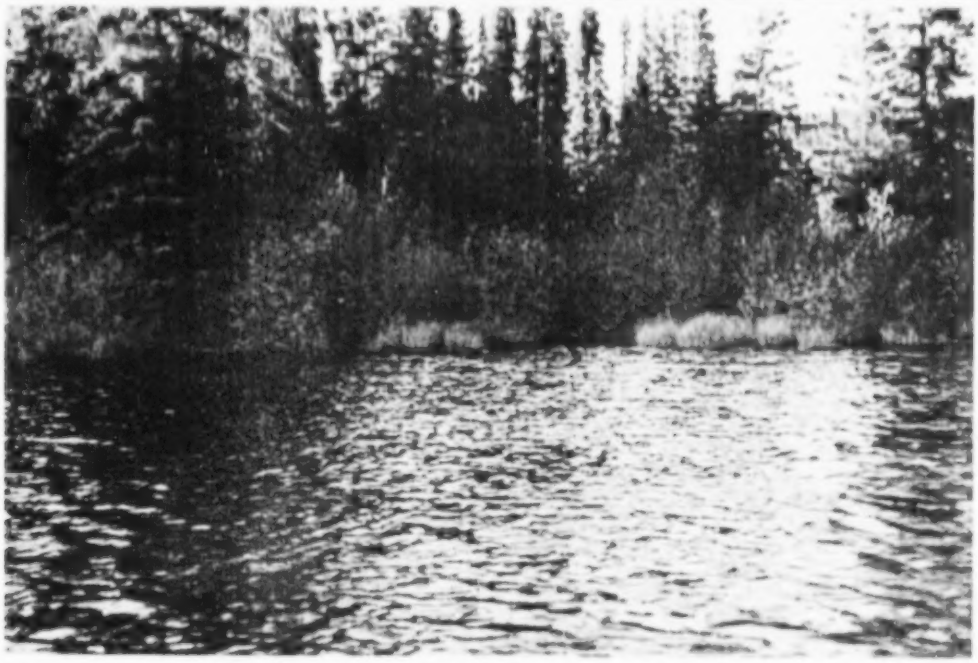


Plate # 5: View of the mouth of Inlet # 1 where it enters Unnamed Lake # 8 in the northeast corner of the lake.

LAKE: **Unnamed Lake # 8**

Plate # 6: Upstream view from the middle of the sample site on Inlet # 1, taken approximately 150 in upstream of Unnamed Lake # 8.

Plate # 7: Downstream view from the middle of the sample site on Inlet # 1, taken approximately 150 m upstream of Unnamed Lake # 8.

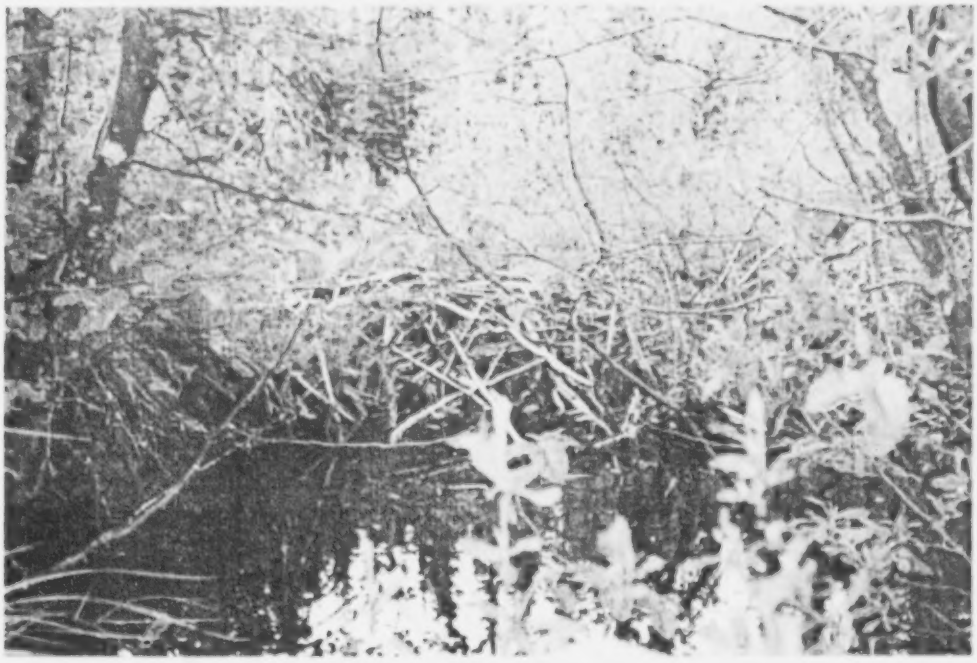


Plate # 8: Upstream view of beaver dam # 1 on Inlet # 2, located approximately 10 m upstream of Unnamed Lake # 8. Dam height is 1.5 m.

Plate # 9: Upstream view of the sample site on Inlet # 2, taken approximately 190 m upstream of Unnamed Lake # 8.

LAKE: Unnamed lake # 8

Plate # 10: Downstream view of the sample site on Inlet # 2, taken approximately 210 m upstream of Unnamed Lake # 8.

Plate # 11: View of the mouth of Inlet # 3 where it enters Unnamed Lake # 8 on the west side of the lake.

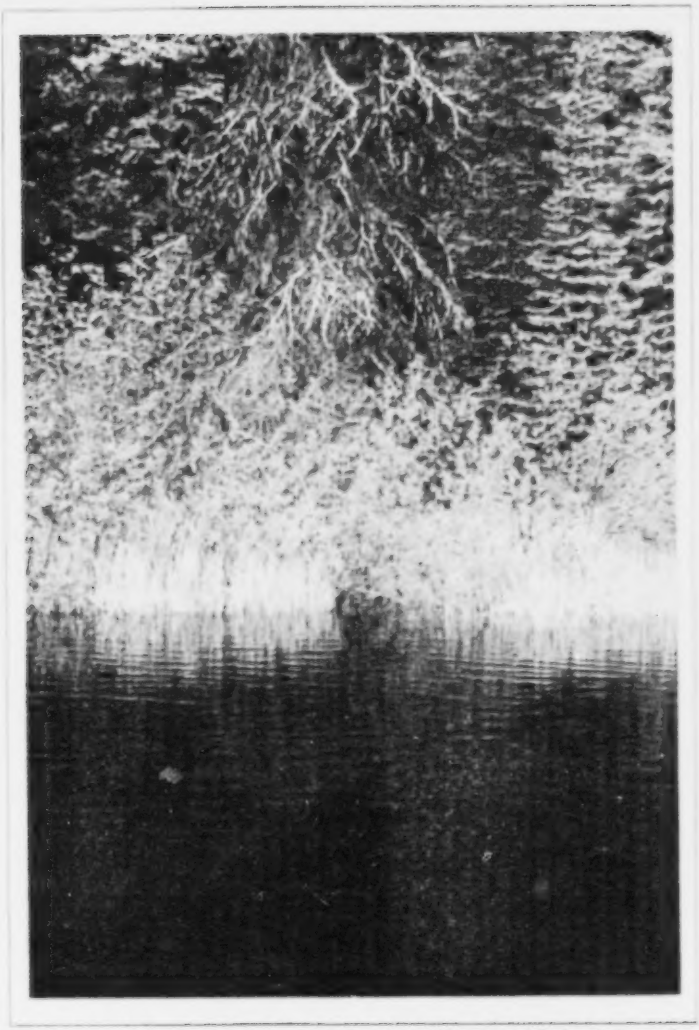


Plate # 12: View of the mouth of Inlet # 4 where it enters Unnamed Lake # 8 on the west side of the lake.

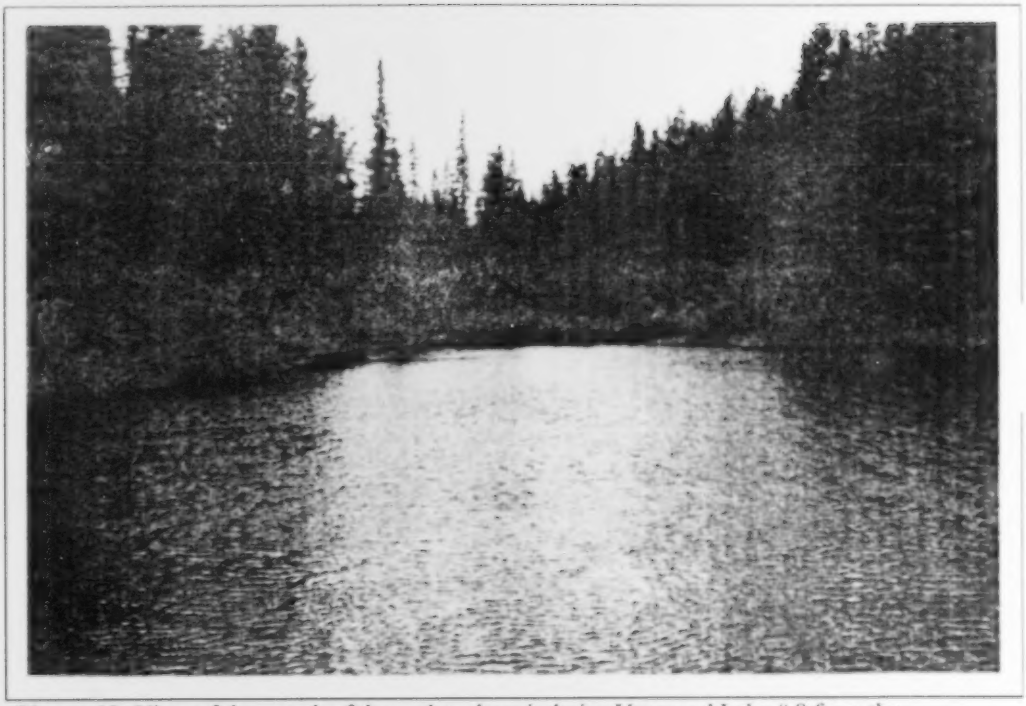


Plate # 13: View of the mouth of the outlet where it drains Unnamed Lake # 8 from the southwest corner of the lake.

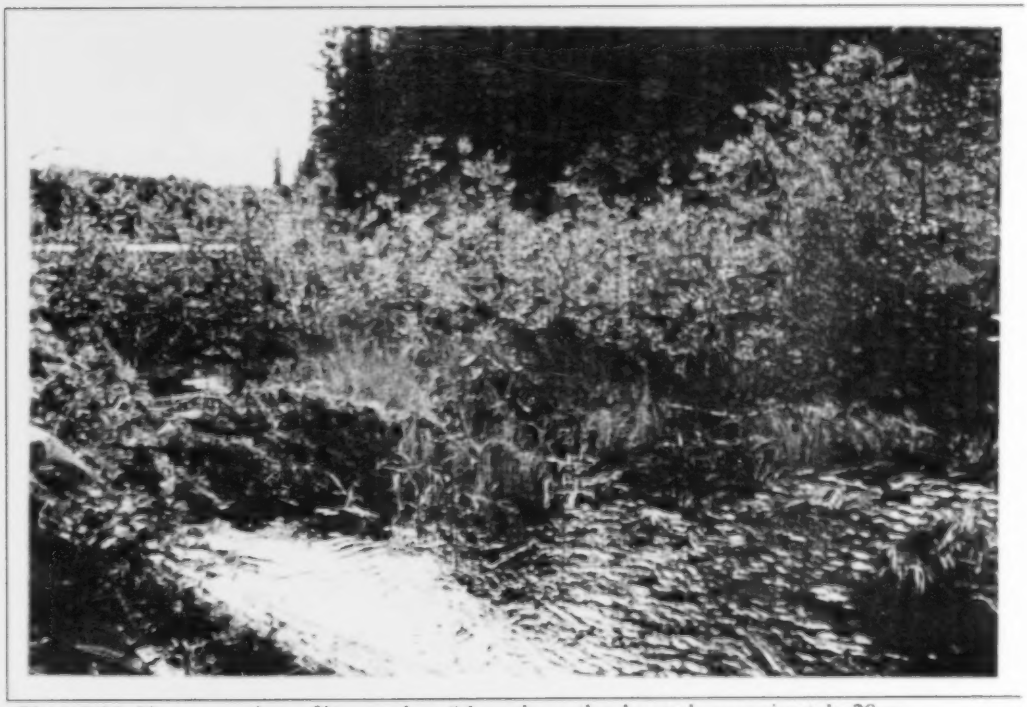


Plate # 14: Upstream view of beaver dam # 1 on the outlet, located approximately 20 m downstream of Unnamed Lake # 8. Dam height is 0.65 m.

LAKE: Unnamed Lake # 8

Plate # 15: Upstream view of the sample site on the outlet, taken approximately 265 m downstream of Unnamed Lake # 8.

Plate # 16: Downstream view of the sample site on the outlet, taken approximately 235 m downstream of Unnamed Lake # 8.

Appendix A

LABORATORY REPORT

Water Chemistry Analysis

RESULTS FOR UNNAMED LAKE #8 E223188 SAMPLES

Parameter Analyzed		Units	96/06/30 0.5M 962507-001	96/06/30 26.5M 962507-002
ALKALINITY		mg/l	60.6	84.9
CONDUCTIVITY		uS/cm	120	169
METALS/TOTAL (WATER-ICP)	AG	mg/l	<.01	-
	AL	mg/l	<.06	-
	AS	mg/l	<.06	-
	B	mg/l	<.01	-
	BA	mg/l	.013	-
	BE	mg/l	<.001	-
	CA	mg/l	21.8	-
	CD	mg/l	<.006	-
	CO	mg/l	<.006	-
	CR	mg/l	.009	-
	CU	mg/l	.008	-
	FE	mg/l	.075	-
	K	mg/l	.3	-
	MG	mg/l	1.5	-
	MN	mg/l	.007	-
	MO	mg/l	<.01	-
	NA	mg/l	1	-
	NI	mg/l	<.02	-
	P	mg/l	<.1	-
	PB	mg/l	<.06	-
	SB	mg/l	<.06	-
	SE	mg/l	<.06	-
	SI	mg/l	2.63	-
	SN	mg/l	<.06	-
	SR	mg/l	.189	-
	TI	mg/l	<.002	-
	V	mg/l	<.01	-
	ZN	mg/l	.014	-
NITROGEN/AMMONIA		mg/l	.01	.009
/NITRITE		mg/l	<.002	<.002
/NITRITE+NITRATE		mg/l	.002	.067
/TOTAL		mg/l	.18	.21
PH		Rel.U.	7.87	7.39
PHOSPHORUS/O-PO4		mg/l	.001	<.001
/TOTAL		mg/l	.017	.021
/TOTAL DISSOLVED		mg/l	.012	.014
RESIDUE/FILTERABLE		mg/l	90	110
/NON-FILTERABLE		mg/l	<5	<5

Appendix B

Tributary Stream Data

D.F.O. / M.O.E. Stream Survey Form

DFO MOE

STREAM SURVEY FORM

PARAMETER	VALUE	MEAN
Ave Chan Width	2.0	2.5
Ave Wet Width	1.5	2.0
Ave Max Pitts Depth		
Ave Max Pool Depth		
Gradient		

BED MATERIALS
Fines
Gravel
Cobble
Boulder
Bedrock

BANKS
Undercut
Overhang
Scour
Slump

DISCHARGE			
#	Distance	Time	Width

REACH SYMBOL

FISH SUMMARY

Species	No.	Size Range (cm)	Life Phase	Method Rel

STREAM VALLEY CROSS-SECTION

PLANIMETRIC VIEW

COMMENTS

1. Stream Stability - Debris - Vegetation - Channel - Substrate - Riparian Type - Land Use - Fisheries - Etc.
2. Stream was [illegible]
3. [illegible]
4. [illegible]

DFO / MOE

STREAM SURVEY FORM

Stream Name		Tower Creek		Sheet		Reach
Watershed Code						
Location						
Date						

C	PARAMETER	VALUE	METH	SPECIFIC DATA
	Ave Chan Width (m)	3.5	ST	4.5 3.0 2.5
	Ave Wet Width (m)	3.0	ST	4.0 2.5 2.0
	Ave Max Pool Depth (cm)			
	Ave Max Riffle Depth (cm)			
	Dredging			
	% Pool - Riffle			
	Side Chan %			
	Other Area %			
	Gradient %			
	COVER Type %			
	Total %			
	Undercut Banks (m)			

C	SUBSTRATE MATERIAL	%
	Fines	
	Silts	
	Sands	
	Gravels	
	Cobbles	
	Bedrock/Rip-Rap	

C	BANKS	
	Height (m)	
	Texture	

OBSTRUCTIONS		
C	Type	Length

	Channel Type				
	Valley Cross Section				
	Stability				
	Riparian Type				
	Riparian Width (m)				
	Riparian Density				

DISCHARGE				
Transect				
Wetted Width (m)				
Mean Depth (m)				
Mean Velocity (m/s)				
Discharge (m³/s)				

REACH SYMBOL

FISH SUMMARY				
C	Species	No.	Size Range (mm)	Life Phase

STREAM VALLEY CROSS-SECTION

PLANIMETER

COMMENTS

1. Trail Crossing
2. Flow recorded above Access
3. Lat Flow

DFO / MOE

STREAM SURVEY FORM

| PARAMETER | | |

Appendix C

FISH SCALE ANALYSIS

Age Determination Completed By:

A.M.C. Technical Services Ltd.
Melinda M. Hirst
6809 Phillip Road.
Lantzville, B.C.
VOR 2HO

SEE ORIGINAL COPY

FOR SCALE SAMPLE READINGS

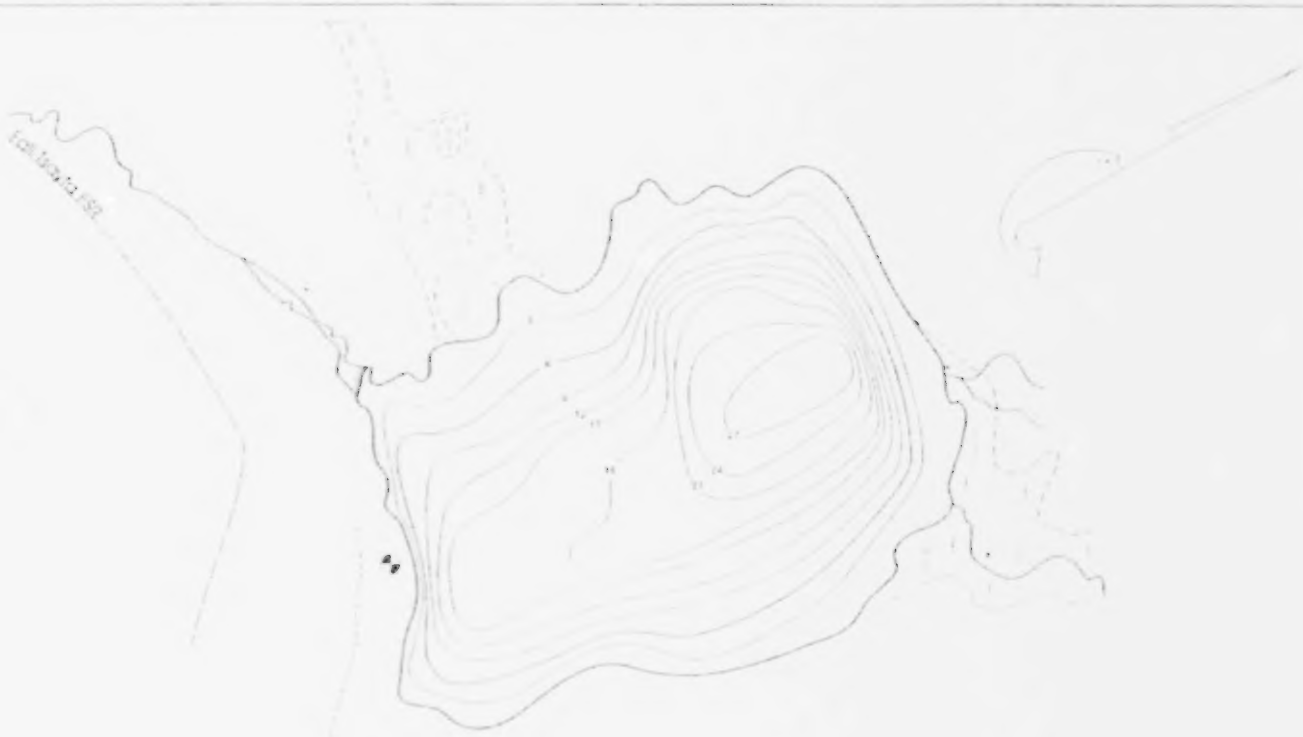
ORIGINAL COPY IS HELD BY

B. C. MINISTRY OF ENVIRONMENT, LANDS AND PARKS

PRINCE GEORGE, B. C.

Appendix D

BATHYMETRIC MAP



Reduced to
34%
of Orignal Size

STATISTICS AT TIME OF SURVEY

Unnamed Lake
(Profile Lake)